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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/608,032	06/30/2003	Toshio Tsukakoshi	239720US90CONT	7562
22850	7590	03/25/2005	EXAMINER	
OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C. 1940 DUKE STREET ALEXANDRIA, VA 22314			STOCK JR, GORDON J	
			ART UNIT	PAPER NUMBER
			2877	

DATE MAILED: 03/25/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.		Applicant(s)	
	10/608,032		TSUKAKOSHI, TOSHIO	
	Examiner		Art Unit	
	Gordon J. Stock		2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 22 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39,41-57 and 59-145 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 64-66,82-84,91,94-104 and 144 is/are allowed.
- 6) ☒ Claim(s) See Continuation Sheet is/are rejected.
- 7) ☒ Claim(s) 18,19,24,41,59,80,111-113,115-121,123-125 and 127-134 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 June 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>20041122;20041026</u> . | 6) <input type="checkbox"/> Other: _____ |

Continuation of Disposition of Claims: Claims rejected are 1-17,20-22,25-39,42-57,60-63,67-79,81,85-90,92,93,105-110,114,122,126,135-143 and 145.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-17, 20-22, 25-39, 42-57, 60-63, 67-79, 81, 85-90, 92, 93, 105-110, 114, 122, 126, 135-143, and 145** are rejected under 35 U.S.C. 102(e) as being anticipated by **Hayano et al. (6,548,312)**.

As to **claims 1-3, 5, 7, 11-13, 20, 21, 22, 43, 44, 47-50, 53, 54, 60, 62, 63, 67, 69, 73, 74, 77, 81, 85, 87, 90, 92, 93, 114, 122, 126, 135, 136, 142, 143, 145**, Hayano in a manufacturing method discloses the following: a measuring process in which wavefront aberration of said projection optical system is measured at one measurement point at the least in a field of said projection optical system using light detection; a calculating process in which at least one targeted image forming characteristic is calculated, based on said measuring of wavefront aberration and a Zernike sensitivity table, database table, is prepared in advance with predetermined values of aberrations (Fig. 8: DBP, DPL, 101; Fig. 14; col. 13, lines 54-65; col. 14, lines 1-35); a plurality of types of image forming characteristics of a plurality of types are each calculated based on wavefront aberration and Zernike table (Figs. 2, 4a-4c, 5, 6a, 6b; col. 7, lines 25-65; col. 8, lines 1-60); a making process in which conditions are set in order to make a Zernike table based on a pattern subject to projection by said projection optical system and said

Art Unit: 2877

targeted image forming characteristic, and Zernike database corresponding to information related to a given aberration of said projection optical system prior to said measuring process (Figs. 8 and 14); the specific optical element, the mask pattern, is adjusted through correction based on aberrations for optimal exposure conditions (Figs. 8 and 12); where calculations, decisions, and corrections done by computer (col. 6, lines 1-20); and a transferring process is accomplished after optimizing exposure conditions through optimization of pattern through correction and through correcting position of mask (Fig. 8: 104; col. 14, lines 45-55); with an exposure apparatus that controls exposure (Fig. 15); a computing unit that relates corrected pattern with adjustment with measurement data and target pattern (Fig. 8: 102-104).

As for **claims 27-30, 33, 34, 37, and 39** Hayano discloses a measuring unit for wavefront aberration and computing image forming characteristics using wavefront aberration and zernike data base with input unit that includes information of pattern, forming characteristics, and information on given information, pattern data base and aberration data base with a second computing unit, correction unit for correcting at least one image forming characteristic of a pattern (col. 14, lines 15-35; Fig. 12); a projection optical system comprising a plurality of optical elements including a specific optical element for adjustment, a mask (Fig. 15) with a correcting unit and storage unit, a database for aberrations and pattern characteristics (Figs. 8 and 12) and a control unit to adjust position of mask in relation to optical axis (Fig. 15: 3m) with Zernike sensitivity table, database table, is prepared in advance with predetermined values of aberrations (Fig. 8: DBP, DPL); a computing unit that relates corrected pattern with adjustment with measurement data and target pattern (Fig. 8: 102-104).

Art Unit: 2877

As to **claims 4, 8, 9, 31, 68, 75, 78, 86, 137**, Hayano discloses everything as above (see **claims 3, 30, 67, 73, 74, 85, 136**). In addition, said information related to numerical aperture, illumination condition, and wavelength of light (col. 7, lines 25-50).

As to **claims 6, 32, 44, 51, 55, 61**, Hayano discloses everything as above (see **claims 3, 27, 44, 50, 54, 60**). In addition, a displaying process in which information related to said targeted image forming characteristics has been calculated is displayed (Figs. 2, 4a-4c, 5, 6a, 6b, 8, 14).

As for **claims 10, 70-71, 76, 88-89**, Hayano discloses everything as above (see **claims 7, 69, 73, 85, 87**). In addition, a specific Zernike table with specific aberration data with specific pattern data is used for each particular pattern exposed (Fig. 12, Fig. 8: DBP and DBL) with exposure control to move corrected pattern optimal position for pattern transfer (Fig. 15: 3m).

As for **claims 14-17, 25, 26, 35, 38, 42, 46, 52, 56-57, 72, 79, 105-106, 138-139, 141** Hayano discloses everything as above (see **claims 1, 20, 37, 44, 50, 54, 67, 73, 114, 137**). In addition, the exposure apparatus is adjustable based on corrected pattern from zernike database and wavefront aberration measurement (col. 14, lines 35-65; col. 14, lines 1-10; Fig. 8: 104; Fig. 15: 3a,); the specific optical element adjusted is the mask, a pattern correction (Fig. 8, 103); wherein optimized corrected pattern is adjusted to an optimal exposure position, and transferred through exposure (Fig. 8: 104; col. 14, lines 45-55).

As for **claims 107-110, 140** Hayano discloses everything as above (see claim 105). In addition, he discloses a plurality of types of image forming characteristics of a plurality of types are each calculated based on wavefront aberration and Zernike table (Figs. 2, 4a-4c, 5, 6a, 6b; col. 7, lines 25-65; col. 8, lines 1-60); a making process in which conditions are set in order to

Art Unit: 2877

make a Zernike table based on a pattern subject to projection by said projection optical system and said targeted image forming characteristic, and Zernike database corresponding to information related to a given aberration of said projection optical system prior to said measuring process (Figs. 8 and 14);). a specific Zernike table with specific aberration data with specific pattern data is used for each particular different pattern exposed (Fig. 12, Fig. 8: DBP and DBL) with exposure control to move corrected pattern optimal position for pattern transfer (Fig. 15: 3m); deciding coefficients of each term in a Zernike polynomial based on wavefront aberration of projection lens; calculating image forming characteristic, corrected pattern characteristics, based on Zernike table (Figs. 8, 12, and 14) with pattern transferred through exposure to photosensitive substrate (Fig. 8: 104; col. 14, lines 45-55).

Allowable Subject Matter

3. **Claims 64-66, 82-84, 91, 94-104, 144** are allowed.

Claims 18, 19, 24, 41, 59, 80, 111-113, 115-121, 123-125, and 127-134 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

As to **claim 18**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an image forming characteristics adjusting method the particular adjustment based on a change in coefficients of each term in a Zernike polynomials, in combination with the rest of the limitations of **claims 18-19**.

As to **claim 24**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an image forming characteristics adjusting method a weighting function, in combination with the rest of the limitations of **claim 24**.

Art Unit: 2877

As to **claim 41**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure apparatus a weighting function, in combination with the rest of the limitations of **claim 41**.

As to **claim 59**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a program a weighting function, in combination with the rest of the limitations of **claim 59**.

As to **claim 64**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an image forming characteristics adjusting method the adjustment based on a change in coefficients of each term in a Zernike polynomial, in combination with the rest of the limitations of **claims 64-66 and 94-104**.

As to **claim 80**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure apparatus the adjustment based on a change in coefficients of each term in a Zernike polynomial, in combination with the rest of the limitations of **claim 80**.

As to **claim 91**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a program the adjustment based on a change in coefficients of each term in a Zernike polynomial, in combination with the rest of the limitations of **claim 91**.

As to **claim 111**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure method calculated as a linear sum of coefficients, in combination with the rest of the limitations of **claims 111-113**.

As to **claim 115**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure method optimizing a weighting function, in combination with the rest of the limitations of **claims 115-121**.

As to **claim 123**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure apparatus wherein calculation uses a linear sum of coefficients of each term in Zernike polynomial, in combination with the rest of the limitations of **claims 123-125**.

As to **claim 127**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in an exposure apparatus optimizing a weighting function, in combination with the rest of the limitations of **claims 127-134**.

As to **claim 144**, the prior art of record, taken alone or in combination, fails to disclose or render obvious in a program that makes a control computer of an exposure apparatus execute a process the adjusting procedure using a change in coefficients of each term in a Zernike polynomial in combination with the rest of the limitations of **claim 144**.

Response to Arguments

4. Applicant's arguments with respect to the claims have been considered but are moot in view of the new ground(s) of rejection. As for the allowable subject matter set forth in the previous action, Examiner apologizes for the inconvenience but upon further search a new rejection has been made.

Fax/Telephone Numbers

If the applicant wishes to send a fax dealing with either a proposed amendment or a discussion with a phone interview, then the fax should:

- 1) Contain either a statement "DRAFT" or "PROPOSED AMENDMENT" on the fax cover sheet; and
- 2) Should be unsigned by the attorney or agent.

Art Unit: 2877

This will ensure that it will not be entered into the case and will be forwarded to the examiner as quickly as possible.

Papers related to the application may be submitted to Group 2800 by Fax transmission. Papers should be faxed to Group 2800 via the PTO Fax machine located in Crystal Plaza 4. The form of such papers must conform to the notice published in the Official Gazette, 1096 OG 30 (November 15, 1989). The CP4 Fax Machine number is: (703) 872-9306

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gordon J. Stock whose telephone number is (571) 272-2431.

The examiner can normally be reached on Monday-Friday, 10:00 a.m. - 6:30 p.m.

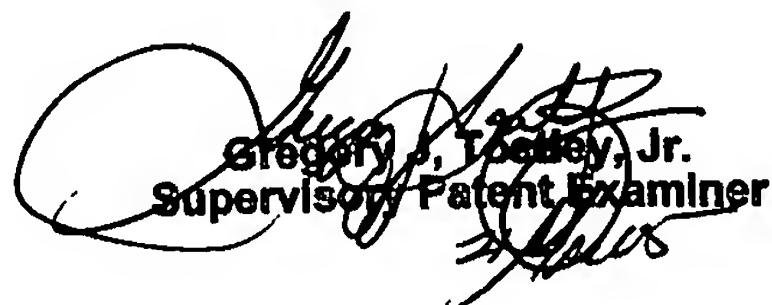
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory J. Toatley, Jr., can be reached at 571-272-2800 ext 77.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private Pair system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).


gs

March 18, 2005

Zandra V. Smith
Primary Examiner
Art Unit 2877


Gregory J. Toatley, Jr.
Supervisory Patent Examiner